

South Asia Centre for Medical Physics and Cancer Research

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BWS BIEF

QUALITY EDUCATION AND HEALTH SCIENCE FOR PATIENT BENEFIT

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Editor's Notes

SCMPCR

Wishing everyone a happy and healthy new year 2023. As we are going forward with aspirations for a dynamic and fruitful year ahead, SCMPCR is geared to face the challenges head on and achieve our goals. We are back in action with hands-on training programs and other activities taking place in person to nurture and support the medical physicists of the region. In this edition of the newsletter, we have reported on SCMPCR activities, educational and professional development programs conducted across member States, scientific articles, news on professional achievements and the chat with the professor segment. We are striving hard to reach out to everyone in the region. Medical Physics is in its infancy in many of the SCMPCR member States, and medical physicists need help with professional development, skill management and knowledge enhancement. SCMPCR is pledged to stand with and support every medical physicist in South Asia in their professional endeavour for excellence. We had experienced hard times when the pandemic struck but stood together to surf the challenges with technology and innovations. As we are determined to make a better world for those who are ailing from cancer, SCMPCR urges its members to come forward with active initiations and contribute enthusiastically to make a difference. We will make sure the year ahead is a better one for all. Wishing everyone all success in every venture in the New Year and ahead.

Editor-in-Chief & Co-Editor-in-Chief, SCMPCR Newsletter.

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Accredited E-learning programs conducted by SCMPCR



SCMPCR Report



Fahim Muhammad Rafiul Islam Program Officer, SCMPCR

Technology has advanced so quickly in the modern era that one person can't learn everything in a single room. Everywhere in the world, there are people with diverse knowledge. In South Asia, around 4 billion people reside. While some regions need more educated professionals but have cuttingedge machinery, other places have qualified medical physicists but inferior equipment. SCMPCR has been conducting e-learning programs on various topics as a regular program since the time of covid to maintain equality in these subjects.

About half of all cancer patients receive radiation therapy at some point in their treatment, often as part of potentially curative therapy, and the rest to slow disease progression or for palliation of symptoms. Some in the medical community assumed that radiation therapy would become obsolete, but this has not been the case; in recent decades, the improvements in the techniques and technology of radiation therapy have been stunning. We are grateful to Prof Röntgen and Madame Marie Curie that we can use their great physics discoveries to serve humanity.

Recent advances in radiation technologies have opened the field to new and promising radiation strategies. South Asia Centre for Medical Physics and Cancer Research (SCMPCR) organised its sixth and seventh elearning program this year to maintain

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this trend of medical physics progress. ELP-6 began on July 1 and ran through July 22. ELP-07 took place from October 7 through October 22. Both were a series of 8 lectures and a group discussion, followed by an online evaluation test. Also, SCMPCR regularly organises elearning programs, hands-on training, and in-service training.

Unlike other e-learning programs, ours is unique. With accredited programs, we offer group discussion and examination facilities. Young students or medical physicists are allowed to be moderators in these programs so that we can develop the skills of the next generation.

About 144 medical physicists registered for the events worldwide. It was a fantastic chance to earn 20 and 32 CPD points recognised by the International Organisation for Medical Physics (IOMP) and European Board for Accreditation in Medical Physics (EBAMP), respectively.

There were participants from 36 different nations. Out of them, 25 are from Bangladesh, 42 are from India, 5 are from Nepal, and the remainder is from other nations, including Israel, Kosovo, Malaysia, Mexico, Sudan, Morocco, Indonesia, China, United Arab Emirates, China, Sudan, Mexico, Egypt, Cambodia, Lebanon, Singapore, Australia, Colombia, Nigeria, Saudi Arabia, Qatar, Kazakhstan, Palestine, Botswana, Romania, Bulgaria, Hong Kong, Philippines, Slovakia and France.

These ELPs were an absolute delight for the participants; each session was instructive and informative. They had a chance to learn from leading medical physics professionals and engage with many other medical physicists.

Reputable international medical physics experts from several countries delivered their valuable talks here. Prof. Dr. Golam Abu Zakaria inaugurated both programs after his welcome speech.

Apart from 8 classes and exams, we had one group discussion day. Professor Dr. Hasin Anupama Azhari and Dr. Jeyasingam Jeyasugiththan were in charge of program moderation. All the students and most speakers were

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Participants attended the SCMPCR E-Learning

present in the group discussion. The students raised all the problems from the previous lectures and they were solved through discussion. Finally, all moderators from previous lectures and some participants shared their experiences.

The evaluation examination for the CDP points was held on July 22 and 28 October 2022. 50 % Marks were the passing marks of the examination. Those who attended the examination and achieved more than 50% marks received a certificate with CPD points. The rest of the participants received the certificate of attendance. Every participant, moderator, as well as speaker enjoyed the courses.

In order to enhance the caliber of our programs, we also solicit feedback from all speakers and participants after each session. We strive to develop future leaders along with QMP to enhance skills in all areas. We promote education that is accessible and of a good standard. Radiation therapy is currently crucial in treating cancer patients because it is one of the major causes of death worldwide. With as little harm to surrounding healthy tissue as possible, radiotherapy aims to deliver a carefully calculated radiation dose to a predetermined tumour volume.

SCMPCR is working nonstop to educate Medical Physicists and Radiotherapists throughout the world. It also offers different in-service training facilities and hands-on workshops in addition to these online learning opportunities. SCMPCR also strives to constantly empower populations involved with cancer for health benefits in keeping with SDG goal 3 of ensuring health and well-being for everyone by 2030.



SCMPCR In-service Training: Medical Imaging and Radiotherapy

Fahim Muhammad Rafiul Islam, Program Officer, SCMPCR

South Asia Centre for Medical Physics and Cancer Research (SCMPCR) has established in 2018 and constantly trying to create skilled manpower for cancer treatment through different categories of programs along with national and international collaborative approaches. The SCMPCR arranges meetings,



seminars, workshops, hands-on training, in-service training, e-learning, and awareness program with the national and international experts for the mass people as well as relevant personnel of the different fields in health sectors for different communicable and noncommunicable diseases, especially for cancer patients.

To meet the challenge of the next industrial revolution and the digitalization of healthcare technologies, SCMPCR has introduced in-service training programs in Bangladesh for medical physicists. These training programs usually cover all the branches of Medical Physics. As we know, onsite training and class provide more benefits than foreign training, where daily problems can be solved and discussed immediately, and knowledge can be shared according to the demands of the students and trainees.

SCMPCR arranges this type of in-service training program each year in different public and private hospitals, universities, Institutes, and rural, remote healthcare centres for health professionals.

This year SCMPCR is invited one senior expert Eng. Salih Arican from Germany for in-service training in October 2022 (24



Figure 2: Participants of the workshop

October -14 November 2022). The training program was conducted at the Military Institute of Science and Technology (MIST). Eng. Salih Arican has expertise in specializing in communications engineering as an electrical engineer (Dipl.-Ing.), Clinical engineering (specializing in radiation protection technology), board certification as a clinical engineer (DGBMT - German Society for Biomedical Technology), Medical radiation physics: radiotherapy dosimetry, radiation diagnostics dosimetry, quality assurance in radiology,

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radiotherapy, Specialist knowledge in radiation protection medicine in all fields of application (handling of open radioactive substances, imaging procedures and radiation treatments) and Safety officer, medical products according to the law on medical products.

A circular is given to different media for applying for the training program on Medical Imaging and Radiotherapy. The organizing committee received an overwhelming response of around 100 applications. SCMPCR in-service committee has selected 37 efficient participants to enrol in the course.

After completing the course, Mr. Salih Arican also offered demonstrative lectures at MIST on advanced imaging technologies of health physics and radiotherapy.



My experience along the track of another successful SCMPCR e-learning program

ELP 07 Computed Tomography and Interventional Radiography

Date: 24th October-14th November 2022



It is my immense pleasure to witness another successful e-learning program conducted by South Asia Centre for Medical Physics and Cancer Research (SCMPCR). Even more overwhelming is that I was lucky enough to be among the privileged 08 moderators for the same event. Therefore, I'm pertinent to share some thoughts and experience about the ELP 07 as an academic in the field of medical physics from Sri Lanka.

SCMPCR marked its successful fourth year in 2022, and to be precise, it was established in 2018 by a group of medical physics experts from the south Asian region to assist in producing skilled manpower, enhance health education and establish a welfare home for cancer patients in the region. It also supports two major United Nations Development Program (UNDP) proposed Sustainable Development Goals (SDGs), also known as the Global Goals.

The UNDP has ranked good health and well-being and quality education in the place of 3rd and 4th in the SGD goals, which has been a major prospect of the SCMPCR. It is noteworthy that the initiative has contributed to ensuring quality education and good health and well-being in the south Asian region. Upon the strike of the Covid-19 pandemic, the passion for education has changed dramatically and markedly increased the tendency of e-learning, whereby teaching is undertaken remotely and on digital platforms.

Research suggests that online learning is versatile and contributes to the increased dissemination of information and time efficiency compared to traditional learning. Adopting e-learning to effectively share knowledge once limited to a group of experts, country, or region is a blessing. There is no doubt that the pandemic has violently endangered the existence of humanity. However, it has positively impacted human lives in many ways.

The SCMPCR has also made this hurdle a fortune to educate their medical physics community beyond the physical borders. The first e-learning session was initiated in mid-2020, and the latest program in October 2022 marked the successful 7th session of the series. Along the route, I was fortunate enough to enrol on most of the programs, which I believe helped me establish myself in the field of medical physics. To be more precise, the programs covered essential topics in radiation therapy, diagnostic and interventional radiology under the scope of medical physics.

The invited speakers were experts from various regions of the world, and they shared their knowledge and experience philanthropically. Also, the SCMPCR elearning programs were interactive, which I noted was lacking in most of the e-learning sessions that I have participated in the past few years. The introduction of a panel discussion at the end of each e-learning session has contributed to the above success.

The accreditation and certification of medical physicists are essential to producing a gualified medical physicist (QMP). The SCMPCR e-learning programs were intended to provide the required skills and updated knowledge to convert a medical physicist (MP) to an internationally recognized QMP. The SCMPCR e-learning programs provide the participants with 32 continuous professional development (CPD) credits based on the European Board for Accreditation in Medical Physics (EBAMP) standards. These CPD credit points are essential to becoming an internationally recognized QMP.

Finally, I would like to express my sincere gratitude to the organizing committee of the SCMPCR e-learning sessions, founder chairman Prof. Dr. Golam Abu Zakaria and Professor Dr. Hasin Anupama Azhari, the CEO of SCMPCR for lifting the south Asian MP education to a globally accepted level.

Determination of Absorbed Dose Why the Monte Carlo based method is very a useful add-on?

Günther H. Hartmann, German Cancer Research Center, Heidelberg, Germany

1. Background: Reference dosimetry

Radiation transport which finally leads to the deposition of absorbed dose to the material in a volume of interest is complex. Therefore, determination of absorbed dose by calculations solely based on the knowledge the physical processes involved is a difficult task.

Nowadays, the most accurate way to approach the problem and determine absorbed dose in water as shown in Fig. 1 is the use of a calibrated ionization chamber in combination with wellestablished procedures and correction factors described for instance in the International Code of Practice TRS 398 [1]. According to TRS 398, the absorbed dose to water at the reference depth in water for a reference beam of quality and in the absence of the chamber is given very simply by:

$$D_{w,Qo} = M_{Qo} \quad N_{D,w,Qo} \tag{1}$$

where M_{Q_0} is the reading of the dosimeter under the reference conditions used in the standards laboratory and $N_{D.W,Q_0}$ is the calibration factor in terms of absorbed dose to water of the dosimeter obtained from a standards laboratory. In most clinical situations the measurement conditions do not match the reference conditions used in the standards laboratory. This may affect the response of the dosimeter and it is then necessary to differentiate between the reference conditions used in the standards laboratory and the clinical measurement conditions. In that case, one must apply well established correction factors, for instance the beam quality correction factor k_{Q,Q_0} , when a dosimeter is used in a beam of quality Q different from that used in its calibration. For reference conditions, these correction factors are given in the TRS 398 documents. As a result, the relative standard uncertainty in the determination of absorbed dose under reference conditions may result at a level between 1% and 2%.

2. Dosimetry under non-reference conditions

However, it may happen that the clinical measurement conditions deviate from reference conditions as covered by TRS 398 in such a way that the necessary correction factors are not directly available. Important examples, for instance shown in Fig. 2 are the use of solid state detectors such as silicon detectors or diamond dosi



MC dose calculations may appear cumbersome, quite time consuming and doable only for specialists [2]. However, they can also tell us a series of important insights. Fundamental in dosimetry is the fact that the total absorbed energy in a volume of interest consists of single energy deposits of random nature. In MC simulations, the equivalent of an energy deposit, is a single energy loss along a charged particle track, de_i which is obtained either by a single electron step or by a condensed history step. Since the total energy absorbed (and thus the absorbed dose) consists almost exclusively by such processes, it is equivalent to say that MC dose calculations are essentially based on tracking the fate and the associated energy losses of electrons.

Based on this fact, the radiological quantity CEMA now gets more attention. It is originally defined as the quotient of the mean







Figure 2: various non-reference measuring conditions

P(x

energy which is lost in electronic interactions in a mass dm of a material by charged particles (mostly electrons), except secondary electrons, incident on dm [14]. The most interesting consequence, however, is that a similar quantity, the restricted CEMA, C_{Δ} is almost equal to the MC calculated absorbed dose in a volume of interest (VOI) [14]. The restricted CEMA can be expressed by a quite simple expression using MC calculated values of the fluence of electrons differential in energy, Φ_F :

$$D \approx C_{\Delta} = \sum_{i=1}^{N} \left[\Phi_E \cdot \left(\frac{L_{\Delta}}{\rho} \right) \right]_i$$
 (2)

where i refers to an energy binning of the kinetic energy of the electrons. Most appropriate is a linear binning with 5 keV bin width in case that $\Delta = 10 \; k \, eV$ is used. $(\frac{L_{\Delta}}{\rho})$ is the restricted mass stopping power of the material in the VOI at bin i. For details, in particular for the summation in eq. (2) see Hartmann & Andreo: Fluence calculation methods in Monte Carlo dosimetry simulations [11], and Hartmann et al: Cema-based formalism for the determination of absorbed dose for high energy photon beams [13].

Although the equality between D and C_{Δ} is an approximation only, it is a very good approximation: for instance at 6 MV photon radiation the difference is less than 0.01%. Subsequently, it is called the CEMA approximation. The volume of interest (VOI) may be of any shape, for instance a cubic voxel, a disc shaped or spherical volume, or the sensitive volume of a dosimeter.

Note: Calculation of $C_{\Delta}\,$ can be quite easily performed with EXCEL by using:

- (a) the values for the restricted mass stopping power, $(\frac{L_{\Delta}}{\rho})$; they can be found in the literature;
- (b) values for fluence differential in energy at bin i, $\Phi_{E,i}$; quite recently they can be obtained by a new version of the MC code 'egs chamber' of the EGSnrc system, see Failing et al: Enhancement of the EGSnrc code 'egs chamber' for fast fluence calculations of charged particles. [8];

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4. Use of the electron fluence: A formal approach for correction factors

A very general application of the spectral electron fluence and the Cema based expression of equation (2) can be formulated for the dose determination under any non-reference condition:

$$D_{w,Q} = M_{Qo} \ N_{D,w,Qo} \ f_{Q,Qo}$$
(3)

where f_{Q,Q_0} is a short term for the ratio , f_Q/f_{Q_0} is beam quality under measuring conditions and Q_0 is beam quality under calibration conditions. f is a general correction factor [4] which can also be obtained using the CEMA approximation and a quite trivial modification (see Appendix) by:

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$$f = \frac{\sum_{i=1}^{N} \left[\Phi_{E}^{w} \cdot \left(\frac{L_{\Delta,w}}{\rho}\right) \right]_{i}}{\sum_{i=1}^{N} \left[\Phi_{E}^{w} \cdot \left(\frac{L_{\Delta,med}}{\rho}\right) \right]_{i}} \cdot \frac{\sum_{i=1}^{N} \left[\Phi_{E}^{w} \cdot \left(\frac{L_{\Delta,med}}{\rho}\right) \right]_{i}}{\sum_{i=1}^{N} \left[\Phi_{E}^{VOI} \cdot \left(\frac{L_{\Delta,med}}{\rho}\right) \right]_{i}}$$
(4)

In this equation $\Phi_{E,i}^W$ is again the fluence differential in energy of the electrons at the point of interest in water, $\Phi_{E,i}^{VOL}$ is the mean fluence differential in energy of the electrons in the VOI, and 'med' denotes the material in the VOI. Calculation of the four sum expressions can again be easily performed using the capacity of EXCEL, the well-known values for the restricted mass stopping ($\frac{L_{\Delta}}{\rho}$) and MC values for the spectral electron fluence calculated (a) for a small water voxel at the point of measurement and (b) for the VOI.

Note:

- The first factor of *f* only corrects for the material in the VOI with respect to its stopping power if different from water. This factor is identical with the stopping power ratio according to Spencer and Attix and frequently denoted as s_{W med}.
- The second factor corrects for any occurring deviation of the mean spectral electron fluence in the VOI from the spectral electron fluence in water at the point of measurement. Deviations may be caused by several influence factors such as the VOI material, its shape, or also by the housing if the VOI refers to a detector (wall effect!). A difference may also occur in case of volume averaging, for instance at small beams or at the field edge. This second factor is therefore considered a fluence correction factor, sometimes also called a fluence perturbation correction factor *p*.

Thus equation (4) can also be written in an abbreviated formulation as:

$$f = s_{w,med} p \tag{5}$$

This derivation of eq. (5) is the most important consequence of the MC method in combination with the CEMA approach as expressed by eq. (2).

It should be mentioned that this equation is already well known based on the classical cavity theory applied to ionization chambers [1,2,4,18,24]. The benefit of the CEMA approach, however, is that a relatively easy and at the same time exact calculation method based on the electron fluence is now available. This characteristic particularly applies for the fluence perturbation . In addition, eq. (5) is generally applicable under any measuring condition, i.e. under reference condition as well as under non-reference conditions.

The summary up to here is:

Without having really performed MC calculations, we can derive a quite fundamental statement on the correction factor which is needed to be applied to equation (1) for the determination of water absorbed dose in a VOI under conditions deviating from calibration conditions. This correction factor is always the product of two factors which separately take into account:

- 1. The material in the VOI with respect to the stopping power; this is accomplished by the Spencer-Attix stopping power ratio $s_{W,med}$.
- 2. Any change of the mean spectral fluence of the electrons in the VOI containing the material 'med' with respect to that at the point of measurement; this is accomplished by the fluence correction factor with:

$$p = \frac{\sum_{i=1}^{N} \left[\Phi_{E}^{W} \cdot \left(\frac{L_{\Delta, \text{med}}}{\rho} \right) \right]_{i}}{\sum_{i=1}^{N} \left[\overline{\Phi}_{E}^{\text{VOI}} \cdot \left(\frac{L_{\Delta, \text{med}}}{\rho} \right) \right]_{i}}$$
(6)

The second factor always focuses on the question: what happens with the electron fluence in the VOI? The message of this work is: That question can always be answered by MC calculations of the electron fluence, in other words: drawing the attention from photons to electron (Fig. 3). With the new EGSnrc code 'egs chamber' [8] a tool is available which provide the required data on the electron fluence using robust methods of variance reduction and which therefore can produce useful results also if scaling depths and absorbed dose from plastic to water. Nevertheless, when accurate chamber positioning in water is not possible, or when no waterproof chamber is available, their use is permitted.

If a plastic phantom is used, two types of corrections or scaling methods are generally required:

- 1. Scaling of depth into the water-equivalent depth.
- 2. Scaling of electron fluence.

5.2. Problems

The methods for depth scaling are well established in theory and practice. In case of high-energy photon beams the depth-scaling factor can be obtained by the ratio of the linear attenuation coefficient between the phantom material and water, and, as an approximation, also by the ratio of the corresponding mass density. However, even if the chamber is now positioned at the water-equivalent depth in the plastic phantom, the fluence of the secondary electrons in the chamber may differ from that when placed in water. In this case it must be corrected by a fluence



Figure 3: Drawing the attention from photon tracks (left in blue) to electron tracks (right in red), same irradiation condition of a spherical volume of interest with a small photon beam



factor

A cema based expression for the correction factor k_{pl} for an ionization chamber can be derived by the requirement:

$$D_w^w(z_w) = k_{pl} \cdot D_w^{pl}(z_{pl}) \tag{7}$$

where $D_W^W(Z_W)$ is the water absorbed dose at the point of measurement in water at depth $Z_{W'}$ and $D_W^{pl}(Z_{pl})$ is the water absorbed dose in the chamber placed in the plastic phantom at the depth Z_{pl} which is the water-equivalent depth of Z_W . Using the CEMA approach it follows:

$$k_{pl} = \frac{D_w^W(z_w)}{D_w^{pl}(z_{pl})} = \frac{s_{w,a}(z_w) \cdot p_w(z_w)}{s_{w,a}(z_{pl}) \cdot p_{pl}(z_{pl})} = \frac{\sum_{l=1}^{N} \left[\Phi_E^{W}(z_w) \cdot \left(\frac{L_{\Delta,med}}{\rho} \right) \right]_l}{\sum_{l=1}^{N} \left[\Phi_E^{VOI}(z_{pl}) \cdot \left(\frac{L_{\Delta,med}}{\rho} \right) \right]_l}$$
(8)

where $\Phi_E^W(Z_W)$ is the spectral fluence in water at the point of measurement, and $\bar{\Phi}_E^{VOI}(Z_{pl})$ is the mean spectral fluence in the chamber placed in the plastic phantom at depth Z_{pl} . It is additionally assumed that $S_{W,a}Z_W \approx S_{W,a}Z_{pl}$. Expression (8)

response of dosimeters were addressed in a series of papers on photon beam. Beyond the interest in a characterization of possibly useful properties of solid state detectors in dosimetry, a specific motivation also was to explain the substantial reduction of response in small beam dosimetry with ionization chambers, a reduction which is not observed to this extent with solid state detectors [5,6,7,30]. Frequently this effect was assigned to the deviation of the mass density of the sensitive detector material relative to that of water (see e.g. Scott et al [23,24,25], Bouchard et al [5], Fenwick et al. [9,10], and Underwood et al [28,29]). This explanation is sometimes also referred to as caused by the 'density effect'. Accordingly, a specific 'density perturbation factor' was supposed to correct for this effect in dosimetry.

On the other hand, the paper of Andreo and Benmakhlouf [3] very clearly have shown that the response of materials used in solid-state detectors for 6 MV small photon field dosimetry can be better described in terms of the stopping power ratio detector-to-water. Thus the adequacy of a 'density perturbation factor' or of

an interpretations of detector response in terms of the mass density alone was questioned.

6.2. Dose response

The exact definition of the dose response (or short: response) R is the ratio between detector signal and absorbed dose to water at the position of measurement in a water phantom without detector. Frequently it is also expressed as the ratio between the mean absorbed dose in the sensitive volume of the detector (='det') with the material 'med', $\bar{D}_{med'}^{det}$ and the absorbed dose at the point of measurement, D_W , thereby putting aside the intrinsic detector dose response [5]:

$$R = \frac{\overline{D}_{\text{med}}^{\text{det}}}{D_{\text{w}}} \tag{9}$$

This expression has the advantage of being quantifiable for any detector material regardless whether a detector signal can be generated with a material of interest or not. Furthermore, \bar{D}_{med}^{det} and D_W can be well obtained by MC calculations where D_W refers to a small water volume at the position of measurement [26].

6.3. A CEMA based expression for the detector response

The formulation (9) for detector response can be converted into an equivalent, CEMA based expression.

$$R = \frac{\bar{C}_{\Delta,\text{med}}^{\text{det}}}{C_{\Delta,\text{w}}} \tag{10}$$

where $\bar{C}_{\Delta,med}^{det}$ is the mean restricted Cema with reference to the material 'med' in the detector and $C_{\Delta,W}$ is the restricted Cema in water at the point of measurement. The Cema based expression now enables a factorization into three sub-factors similar as already applied for the correction factor *f* in eq. (4). One then obtains:

$$R = \frac{\sum_{i=1}^{N} \left[\Phi_{E}^{w} \cdot \left(\frac{L_{\Delta \text{med}}}{\rho} \right) \right]_{i}}{\sum_{i=1}^{N} \left[\Phi_{E}^{w} \cdot \left(\frac{L_{\Delta}}{\rho} \right) \right]_{i}} + \frac{\sum_{i=1}^{N} \left[\Phi_{E}^{\text{det}} \cdot \left(\frac{L_{\Delta \text{med}}}{\rho} \right) \right]_{i}}{\sum_{i=1}^{N} \left[\Phi_{E}^{w} \cdot \left(\frac{L_{\Delta \text{med}}}{\rho} \right) \right]_{i}} + \frac{\sum_{i=1}^{N} \left[\Phi_{E}^{w} \cdot \left(\frac{L_{\Delta \text{med}}}{\rho} \right) \right]_{i}}{\sum_{i=1}^{N} \left[\Phi_{E}^{w} \cdot \left(\frac{L_{\Delta \text{med}}}{\rho} \right) \right]_{i}}$$
(11)

Note:

- The first and material dependent factor of the response R only depends on the deviation of the mass stopping power of the detector material 'med' from that of water. It is therefore denoted as R_{stp}.
- The second factor only depends on the deviation of the mean spectral electron fluence in the detector from that in a detector with same shape but filled with water. Deviations

Material	Mass density ρ (g cm ⁻¹)	Ī
Lithium	0.534	3.0
Water	0.998	6.6
Air	1.205 10 ⁻³	7.6
Silicon	2.33	14

of the fluence may be caused by influence factors such as the material or shape. It is therefore denoted as R_{fl} .

 The third factor is due to the averaging effect. It depends on the deviation of the mean spectral electron fluence in the detector filled with water from that in water at the point of measurement. Such deviations occur at small beams or at the field edge. This factor is therefore denoted as R_{vol}.

In summary, the total detector response can be expressed by the following product of three response factors where each of them separately takes into different influence factors:

$$R = R_{stp} \cdot R_{fl} \cdot R_{vol} \tag{12}$$

R

6.4. Some material examples

The following examples for the material dependent response refer to a simplified detector model, i.e. a wall-less detector consisting of a cylindrical cavity only. The cylinders have a thickness of 1 mm, a diameter of 6 mm, and are filled with the material of interest, specifically with lithium, water, air, and silicon (Tab. 1).

The point of measurement was 1.5 cm for a 6 MV beam in a cubic water phantom with a side length of 30 cm. A point source was used with SSD=95 cm, two circularly shaped beams were applied: a diameter of 2 cm (denoted as large beam) and a diameter of 1 mm (denoted as small beam). Results are given in Tab. 2 for the large beam and in Tab. 3 for the small beam.

These results clearly show:

 The detector response indeed differs with the detector material, however, not in a density dependent manner

Material	Response <i>R</i>	R_{stp}	R _{fl}	R_{vol}
Lithium	0.815	0.850	0.940	1.019
Water	1.019	1.000	1.000	1.019
Air	0.817	0.806	0.994	1.019
Silicon	0.923	0.786	1.153	1.019

Table 2: Detector materials and response factors under the large beam condition

Table 3: Detector materials and response factors under the small beam condition

Material	Response R	R _{stp}	R _{fl}	R _{vol}
Lithium	0.0524	0.851	0.842	0.073
Water	0.0731	1.000	1.000	0.073
Air	0.0438	0.806	0.744	0.073
Silicon	0.0732	0.785	1.274	0.073



Figure 5: The material dependent spectral electron fluence found for the examples of this subsection.

- The most important influence is the variation of the stopping power ratio which contributes with more than 20%. This influence is equal at both field sizes.
- The change of the electron fluence dependent on the material is found; thus this effect also contributes to the variation of the response (Fig. 5, left). Fluence changes are more pronounced in the small beam (Fig. 5, right).
- A considerable reduction of the response occurs at the small beam size (see also [5,6]. This is clearly due to the volume averaging effect [16,19,20,21]. This effect does not depend on the material.

In summary it can be stated that the material dependent variation of the response is caused by different influence factors, mainly by the stopping power ratio, but also by fluence changes. However, a variation due the mass density is not directly observable, with one exception: under the small beam condition the fluence dependent factor is considerably reduced at the very low density of air. This effect, also referred to as density effect, is well known, but still needs an explanation. A general density correction factor, however, is obviously not required.

7. Summary

It was shown that the MC method yielding data on the electron fluence and thus on CEMA offers a useful tool for the assessment of correction factors required for the determination of water absorbed dose under various measuring conditions. In order to apply this method, the availability of data of the electron fluence differential in energy is an is absolute prerequisite. This can be achieved by a new version of the MC code 'egs chamber' of the EGShrc system (Failing et al: Enhancement of the EGSnic code 'egschamber' for fast fluence calculations of charged particles).

Appendix: The CEMA based derivation of the equation: $f = \int_{W,med} p$

The conversion of the absorbed dose between two media, in part cular between the dose in a homogeneous medium, for instance water, and that measured in a detector plays a central role in the classical cavity theory [4]. This conversion is usually denoted by a factor *f* and defined for water as:

$$f_Q = \left(\frac{D_{\rm W}}{\overline{D}_{\rm med}^{\rm VOI}}\right)_Q \tag{A1}$$

where the dose is to be determined for a given radiation beam quality Q. D_W is the water absorbed dose at the point of measurement in a water phantom and \bar{D}_{med}^{VOI} is the mean absorbed dose in a volume of interest (VOI) placed at this point and filled with the material 'med'. In a MC calculation it is relatively straightforward to calculate \bar{D}_{med}^{det} as the average energy deposited by all charged particles within the volume of interest divided by its mass. However, calculating the dose at a single point, D_W , requires considering an infinitesimally small volume, an approach that relies on some kind of interpolation process.

In the CEMA approach the values of absorbed dose in eq. (A1) are substituted by the corresponding CEMA values:

$$f = \frac{C_{\Delta,\mathbf{w}}}{\bar{C}_{\Delta,\mathrm{med}}^{\mathrm{VOI}}} = \frac{\sum_{i=1}^{N} \left[\Phi_{E,w}^{w} \cdot \left(\frac{L_{\Delta,w}}{\rho} \right) \right]_{i}}{\sum_{i=1}^{N} \left[\bar{\Phi}_{E,\mathrm{med}}^{\mathrm{VOI}} \cdot \left(\frac{L_{\Delta,\mathrm{med}}}{\rho} \right) \right]_{i}}$$
(A2)

By a simple extension with the ratio $\frac{C_{\Delta,W,med}}{C_{\Delta,W,med}} = 1$, eq. (A2) can be converted into:

$$f = \frac{c_{\Delta,w,w}}{\bar{c}_{\Delta,\text{med,med}}^{\text{VOI}}} \cdot \frac{c_{\Delta,w,\text{med}}}{c_{\Delta,w,\text{med}}} = \frac{c_{\Delta,w,w}}{c_{\Delta,w,\text{med}}} \cdot \frac{\bar{c}_{\Delta,\text{med,med}}^{\text{VOI}}}{c_{\Delta,\text{w,med}}}$$
(A3)

or using the sum formulation

$$f = \frac{\sum_{i=1}^{N} \left[\Phi_{E,w}^{W} \cdot \left(\frac{L_{\Delta,w}}{\rho}\right) \right]_{i}}{\sum_{i=1}^{N} \left[\Phi_{E,w}^{W} \cdot \left(\frac{L_{\Delta,med}}{\rho}\right) \right]_{i}} \cdot \frac{\sum_{i=1}^{N} \left[\Phi_{E,w}^{W} \cdot \left(\frac{L_{\Delta,med}}{\rho}\right) \right]_{i}}{\sum_{i=1}^{N} \left[\overline{\Phi}_{E,med}^{VOI} \cdot \left(\frac{L_{\Delta,med}}{\rho}\right) \right]_{i}}$$
(A4)

Here the first ratio is the MC and fluence based expression of the Spencer-Attix stopping power ratio, $S_{W,med}$ and the second ratio is the MC and fluence based expression for the fluence perturbation factor, p:

$$f = s_{w,med} p \tag{A5}$$

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The influence of variations of the beam quality for high energy photon beams on tissue inhomogeneity correction factors for radiotherapy treatment plans

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Introduction:

Radiation therapy has been used for many years to treat various types of cancers [1, 2]. The maximization of therapeutic benefit for radiation treatments is essentially dependent on the delivery of the prescribed dose to the planning target volume (PTV), while the dose received by the surrounding organ at risk (OARs) is simultaneously minimized. To achieve this goal, it is significantly important to either accurately specify the spatial localization of all pertinent structures or calculate the absorbed dose [3]. According to reports 50 & 62 of the international commission on radiation units (ICRU), the error in radiotherapy treatment, including contouring, treatment planning and dose calculation, patient positioning, and dose delivery, should be less than 5% [4-5]. In order to address this level of accuracy, several task groups over the past decades have extended systematic quality assurance (QA) protocols for three-dimensional (3D) radiotherapy treatment planning systems (TPSs). Various recommendations have been raised by those reports for specific QA of a TPS, which includes anatomical and beam descriptions, dose calculations, as well as data output and transfer. The most important part of the QA is based on comparing measured and calculated dose distributions for inhomogeneities- the so-called inhomogeneity correction factors (ICFs). For inhomogeneous geometry, the task is challenging and time and resource intensive. Some results of such measurements may be found in the literature [6-9]. To facilitate the QA procedure, it is convenient if ICFs are measured by one user and used by another. This work aimed to investigate how much ICFs depend on the beam quality- the tissue-phantom ratio (TPR20,10) for external beam radiotherapy treatment plans.

Materials and Method:

To assess the dependence of ICFs on beam quality index (TPR_{20,10}), 6 MV and 15 MV photon energies were considered. The range of TPR_{20,10} values were as follows:

for 6 MV, k = -3, -2, -1, 0, 1, 2, 3

for 15 MV, k = -3, -2, -1, 0, 1, 2, 3

The TPR_{20,10} values were obtained from the secondary standard dosimetry laboratory (SSDL) of Maria Sklodowska-Curie National Research Institute of Oncology, Warsaw, Poland [10]. The ICFs were calculated in Eclipse 13.6 (Varian Medical System, Palo Alto, California, USA) TPS with the anisotropic analytical algorithm (AAA) for photon beam energies described by the quality indexes given above.

Ninety patients with lung, gynaecological and prostate tumours were selected (thirty patients for each tumour site). The goal was to investigate the influence of tissue inhomogeneities on dose distribution. All patients were treated with a 3DCRT technique with a Varian Clinac 2300CD linear accelerator incorporating a 120-leaf MLC at the Maria Skłodowska Curie Memorial Cancer Centre and Institute of Oncology, Warsaw, Poland. An example of the treatment plans for lung, gynaecology and prostate tumour cases are illustrated in figure- 1 (a),

(b), and (c). These treatment plans were recalculated for each beam quality without any beam modifier. ICFs were calculated for each beam angle individually. Each dose distribution was calculated with and









Figure 1: Shows comparison of the doses received by PTV and OARs.



Figure 2: ICFs as a function of QI for a beam angle for lung, gynaecology and prostate tumour treated with 3DCRT technique for 6 MV (a) and 15 MV (b) photon energy. The absolute ICFs for the QI of 0.670 were 1.233, 1.051 and 0.916 for Lung, Gynae and Prostate tumor respectively. The absolute ICFs for the QI of 0.760 were 1.117, 1.032 and 0.940 for Lung, Gynae and Prostate tumor respectively.



Figure 3: Percent of ICFs difference as a function of the difference between physical (D_{ref}) and radiological (D_{rad}) depths for 30 lung 3DCRT treatment plans for 6 and 15 MV photon energy. The ICFs differs up to 8.2% over the QI range for Lung 3DCRT treatment plans.



Figure 4: Percent of ICFs difference as a function of the difference between physical (D_{ref}) and radiological (D_{rad}) depths for 30 Gynaecology 3DCRT treatment plans for 6 and 15 MV photon energy. The difference between reference and radiological depths, the ICFs differ up to 2.0% over the QI range.



Figure 5: Percent of ICFs difference as a function of the difference between physical (D_{ref}) and radiological (D_{rad}) depths for 30 Prostate 3DCRT treatment plans for 6 and 15 MV photon energy. The difference between reference and radiological depths, the ICFs differ up to 2.0% over the QI range

without an inhomogeneity correction to obtain the ICFs. For each case, the ICFs were calculated at the isocenter.

The dependence of ICFs on the energy spectrum was investigated as a function of physical depths (D_{ref}), radiological depths (D_{rad}), and the difference between D_{ref} and D_{rad} (D_{ref} · D_{rad}).

Results and Discussion:

Figures 2(a) and 2(b) present the ICFs calculated for lung, gynae and prostate treatment plans for 6 MV and 15 MV X-rays. The data were normalized to the QI = 0.670 for 6 MV and the QI = 0.760 for 15 MV. Calculation of ICFs was performed for several field sizes with the AAA method for 6 MV and 15 MV X-rays for lung, gynaecology and prostate are presented in Figures 3(a) and 3(b); 4(a) and 4(b); 5(a) and 5(b); respectively. The data were normalized to the QI = 0.670 for 6 MV and the QI = 0.760 for 15 MV.

Conclusions:

The influence of energy variations on inhomogeneity correction factors for gynaecology and prostate is rather small. However, emphasis must be given to lung cases as the study found a relatively higher discrepancy with the beam quality.

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Total Skin Electron Irradiation (TSEI) in Kathmandu Cancer Center Hospital.

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Total skin electron irradiation (TSEI) is a special radiotherapy technique aiming to deliver a homogeneous dose to a patient's entire skin while sparing all other organs from a significant amount of radiation. As TSEI is an accepted and effective means, specifically for Mycosis fungoides and cutaneous lymphoma, it remains a consequential treatment in palliative and chronic control of the early-stage disease. However, it is a complicated treatment requiring a skilled multi-disciplinary team. To ensure that all skin surfaces are exposed to the radiation beam, patients stand in various positions by following methods such as the Stanford technique. Depending on institutional protocol, patients are positioned on either a rotary or a stationary stand at a source-to-surface distance (SSD) of 3 to 5 m.

Kathmandu Cancer Center Hospital (KCC) has an Elekta Synergy linear accelerator having electron beam energy from 4 MeV to 15 MeV. TSEI in KCC is carried out on 6 MeV electron beams with 40×40 cm² field size (at 1 m SSD) at a SSD of 330 cm behind a 5 mm thick beam degrader.





Figure 1 (a) Patient positions during TSEI treatment1. [1Total skin electron beam treatment patient leaflet. C.C.f.O.-N.F. Trust; 2008] (b) Tilting of gantry required during positioning.





Figure 2: (a) 2 mm lead equivalent spectacles, (b) Nails shielded using lead sheets and bolus.

The dosimetric characteristics are verified experimentally using a parallel plate ion chamber. The basic dosimetric parameter consists of beam profile, depth dose curve, hinge angle, and electron beam output in the treatment plane. Patients are treated in six different upright patient positions using dual-angle fields, and the prescribed dose is 36 Gy in 9 weeks with fractionation of 4 Gy per week. The total body irradiation of 2 Gy is achieved by irradiating the patients in six different positions, as shown in figure 1. in 2 days. Patients are treated for 4 consecutive days while the remaining 3 days of the week are taken as rest.

The PDD curve of 6 MeV electron beam corresponding to electrometer reading (percentage dose) and chamber depth (mm) are obtained for a constant SSD 330 cm and field size 40 cm × 40cm. The estimated most probable electron beam energy, Ep,0 at the patient surface plane, is 4.96 MeV. Eyes are shielded using 2 mm lead equivalent spectacles, while the toes, nails and finger nails are shielded using a combination of bolus and 2 mm lead sheet (figure 2). Patients are treated in standing six upright positions, and for each upright position, dual fields are used to cover the whole body by the field size. For the treatment of the upper and lower parts of the patient, the gantry has to be tilted up and down with an appropriate hinge angle of 18°. Although all the body parts are

Scientific Article



Figure 3: Various treatment positions of patient during TSEI treatment.

irradiated during the treatment, the sole of the feet remains unexposed to the radiation. So the sole of the feet is irradiated separately, with the feet kept in a water bath and the electron beam irradiated from a 180° tilted gantry (figure 3). Similarly, the scalp is found to be inadequately irradiated, so an electron scalp boost can be given.

Three patients with mycosis fungoides have already been treated in our center following the modified Stanford TSEI technique. It was observed that the disease disappeared within a few months of the radiation therapy for all of the patients. Information and techniques about the treatment procedures are shared in detail with the patient before the treatment. Toxicities like reddening of skin, swelling, tiredness, vomiting, and hair loss were seen in the patients during and after the time of treatment (figure 4).

Treatment of diseases like mycosis fungoides is still a challenge, and these diseases should be managed by a skilled multi-disciplinary team. TSEI is a curative treatment with acceptable non-life-threatening toxicities.



Figure 4:Pre- and post- treatment condition of a patient



Congratulations | Mr Dinesh Babu

SCMPCR congratulate Mr Dinesh Babu for receiving the Meritorious Medical Physicist Award 2022. He works as a medical physicist cum radiological safety officer at Thiruvarur Medical Centre, Tamil Nadu. He has been teaching medical physics to postgraduate students, paramedical and radio diagnosis students for over 12 years. He supervised the decommissioning of various telecobalt units in India. He commissioned a new linear accelerator in a rural institute, and as a result, economically weaker section patients benefited from a new technical treatment. He completed his master's degree in physics from Madurai Kamaraj University and his postgraduate diploma in radiological physics (45th Batch) from Bhabha Atomic Research Centre, Mumbai. He loves learning and upgrading new technologies. He is an active member of the association of medical physicists of India.



"Prof Azhari is the Director of the Centre for Biomedical Science and Engineering, United International University (UIU), Bangladesh, since July 2021. Her exemplary medical physics career turned out to be a beacon for not only women medical physicists but also everyone who aspires to be a medical physicist in Bangladesh, crossing borders to south Asia, Asia, Oceania and across the globe spans over about 2 decades. She is the upcoming Vice President of Asia-Oceania Federation of Organizations for Medical Physics (AFOMP) (2023-2025) after her commendable services as Secretary General for two terms."

The challenges faced by medical physics professionals across South Asia are diverse in themselves and in their complexity. Actions are being taken at various levels to resolve the problems and uplift the professional status. One such initiative is South Asia Centre for Medical Physics and Cancer Research (SCMPCR), established in 2018 with the motto 'Quality education and health science for patient benefit'. The major activities of SCMPCR are to produce skilled manpower and enhance health education to maintain high standards and higher efficacy till date through various activities. For this issue of the newsletter, we are privileged to have Prof Hasin Anupama Azhari, the honorary CEO of the organization. Here is a snippet of the chat with Prof Azhari by Dr. Mary Joan regarding her vision and mission for medical physicists of South Asia and Asia Oceania, especially for the strongly developing women medical physicists' community in the region.

MJ: Congratulations and best wishes for your upcoming Vice Presidentship of AFOMP. We would like to hear about your personal journey as a medical physicist in the last two decades.

HAA: Thank you Dr. Mary Joan. I am honoured to have the chance to lead the AFOMP, one of the biggest, most active, and oldest medical physics communities in the Asia-Oceania region, as vice president from 2023 to 2025.

My interest in human services has always been piqued. I always wanted to help people by providing health-related services. After a long career in the medical field, I found that medical physics is a subject that is essential in cancer treatment. It did not exist in Bangladesh. Also, when I heard that only Gono University had started this subject, I went there to learn everything I could about it. I learned that German professors led by Prof. G A Zakaria were conducting numerous seminars to establish this subject in reputable universities in Bangladesh, to later collaborate for student exchange and teacher development at Gono University. I also checked the website and tried to find out about the subject. Also, I came to know the Medical Physics history of Bangladesh. I heard that some people tried their hardest to establish MP under the guidance of Prof. Zakaria, Germany. Still, it was challenging to Medical Physics Professional Development in South Asia: Pathfinder and Proponent

make it understandable to medical doctors. Recognizing the significance of this profession, I left medicine to pursue an MSc through a DAAD scholarship and a PhD in MP from Italy through an OWSD scholarship. It was extremely difficult for me to study physics and math as a prerequisite for the course once more. Then I joined this profession to help develop medical physics in Bangladesh. I travelled to several countries, including India, China, Italy, and Germany, to gain practical work experience.

At that time, there were no hospital medical physicists as well as academic faculty in this field. I started my medical physics profession as an academic faculty at Gono Bishwabidyalay as a junior faculty. I worked tirelessly to convey this department's institutional form and trends with the cooperation of all. I deeply involved myself in the formidable challenge of establishing and excelling in the subject of medical physics in the country. I devote myself as a craftsman to building a unique academic program to develop human resources necessary for cancer treatment for the country's welfare.

I, with a team, have contacted all hospitals, health directorates, and health ministries to make them understand the importance of medical physics, created posts, regularly wrote about the





In various activities of Medical Physics Department at Gono University

subject in national newspapers, and undertook various activities like national and international conferences to promote this department in public and private hospitals and arranging jobs for the students who passed out.

In 2009, as the founding president, we established the Bangladesh Medical Physics Society, a professional body of medical physicists, to give an organizational form to the promotion and expansion of Medical Physics and to improve the recruitment process of medical physics at public and private levels. In 2010, with the students of this department, we contributed to the Bengali dictionary of medical physics in the International E-Encyclopedia Dictionary of Medical Physics (A project of IOMP). We have collaborated with the institutes and hospitals of Germany, India and China, where the students and early career physicists from Bangladesh had the opportunities for training and research. Medical physics education has been developed through all these activities and can achieve success and sustainability.

Almost all medical physicists currently working in Bangladesh have graduated from this institution. This example of developing medical physics in Bangladesh is widely appreciated internationally. African country Rwanda is requested for cooperation in establishing medical physics. Later, in the context of discussions with the Ministry of Health of Rwanda, the cooperation program started in Bangladesh regarding the establishment of medical physics there. As a result, two Rwandan students are contributing to cancer treatment in their country by getting a Master in Medical Physics from Gono University. They are the first medical physicists in the history of Rwanda. Moreover, 5 Medical Physicists from Nepal have completed their Master's. They are now working in various government and private hospitals in Nepal. They were the first students in their country to complete their Master's in Medical Physics.

International Medical Physics Certification Board (IMPCB) has developed a certification process for the courtiers where no certification systems exist. According to international norms, since medical physicists are directly related to the treatment of patients, 2 years of clinical training is required after a Master's degree. To become a Certified Qualified Medical Physicist, the physicists should have passed the certification exam. I organized the examination of IMPCB in 2018 and 2021 in Bangladesh. Few physicists from Bangladesh and other South Asian countries have been certified through the IMPCB certification process.

There is no recognized accredited training hospital for residency programs, and a shortage of senior supervisors in Bangladesh. Also, it is only possible to train some students abroad for 2 years. To address these issues, with the initiative of Prof. Dr Golam Abu Zakaria, we established the South Asia Centre for Medical Physics and Cancer Research (SCMPCR) under Alo Bhubon Trust in 2018. SCMPCR regularly organizes various accredited training (Handson workshops, in-service training, e-learning programs) for medical physicists and other cancer care professionals. So giving accredited training through this program increases their Continuous Professional Development (CPD) points. As a result, he/she will have the opportunity to become a Clinically Qualified Medical Physicist by achieving CPD points.

MJ: I am exhilarated to hear the story of your perseverance in establishing a medical physics training program in Bangladesh, serving not only Bangladesh but also neighbouring countries and even Rwanda. Also, you have worked tirelessly to develop medical physics as a profession in Bangladesh and South Asia. What are your comments on the current status of affairs around here?

HAA: The South-Asia (SA) region, with its eight countries, has approximately one-fourth of the world and 40% of Asia's population. Only five countries (Bangladesh, India, Nepal, Pakistan, and Sri Lanka) out of a total of eight from the region have radiotherapy services. Cancer patients from Afghanistan,



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Bhutan, and Maldives depend on other countries to access radiotherapy services. South Asia needs 2338 megavoltage teletherapy units, 706 HDR brachytherapy units, 4676 radiation oncologists, and 2923 medical physicists by 2030. This well-known fact indicates that this region of the world requires improvement in its strategies for cancer management.

Regional cooperation and more initiatives to develop knowledge and expert knowledge transfer are needed to face the current challenges in South Asia. Although medical physics is progressing gradually in South Asia, compared to the global context, even with South East Asia, there is a massive disparity in the medical physics profession and a lack of QMP. As EXCOM of AFOMP, we may overcome this disparity if we can decentralize through the collaboration of small, underdeveloped countries with one/two developed countries under AFOMP.

MJ: The most admirable aspect of your career is you have not limited your scope to classrooms or TPS. You have taken active leadership roles not only in Bangladesh but also internationally. We would like to hear about your most exciting experiences?

HAA: Since 2009, as the founding president of the Bangladesh Medical Physics Society (BMPS), I have begun to interact with the

international medical physics communities at several international conferences. I also became a member of AMPI while studying MSc in MP. The reason is to learn about medical physicists in India for research and publication, as there is little research and work in this field in Bangladesh as the subject is new.

Many national and international colleagues inspired and helped me along the way, especially Prof. Dr. Golam Abu Zakaria, Germany, who introduced my activities in Europe as well as in Bangladesh and aided me greatly in my career, and Prof. Dr. Arun Chougule, India, who assisted and supported me during my tenure as SG AFOMP, and Prof. Slavik Tabakov, Former President IOMP, who gave me the opportunity to be a project coordinator for Bengal translation at EMITEL e-Encyclopaedia of Medical Physics and Multilingual Dictionary and Terms, a project of the International Organization of Medical Physics (IOMP), and which made BMPS an affiliate member of IOMP during my tenure as president, BMPS; Prof. Raymond Wu, who assisted me greatly in establishing BMPCB and holding IMPCB examinations in our country.

For me receiving the "International Day of Medical Physics award 2018" from IOMP and taking the role of AFOMP General



SCMPCR Hands on workshop program organized for medical physicists working in various hospitals in South Asia including Bangladesh.



SCMPCR In-Service Training Program for Oncologists and Medical Physicists working in National Institute of Cancer Research and Hospital (NICRH), Dhaka, Bangladesh

Secretary (2019-2022) has been an exciting experience. During those years, I have been in close contact with all my colleagues serving as officers on the AFOMP board and with the national member organizations through their presidents, council delegates, and individual members.

MJ: It is clear that you have taken a special interest in uplifting and promoting women medical physicists for their career and personal development. What are your comments on the current professional scenario for women medical physicists worldwide, especially in South Asia?

HAA: As an executive member of the Organization for Women in Science for the Developing World (OWSD), I have been actively involved in developing women in science since my early career. I have worked in the IOMP women's group as well.

Women are underrepresented in the field of medical physics. In developing countries, women face many unanticipated challenges caused by jealousy and patriarchal society, and naturally due to family responsibilities, childbearing and others. As a result, we can see many women graduates who need help to grow themselves in research and higher education. Adequate Support from family and colleagues and self-awareness for developing knowledge and skills could help to improve the scenario for women medical physicists in South Asia. Throughout my academic and administrative careers, I have always counselled my female students for research and guided them as a mentor on how a female can be a leader, and I continue to do so.

MJ: We would like to hear about your action plans for your tenure as the AFOMP Vice President?

HAA: I have served the AFOMP community as the organization's Secretary General from 2019-2022. I am fortunate to have had the opportunity to work with Past President, Prof Arun. Now I'm with Prof. Eva Bezak, the current President. Both are visionary leaders who want to incorporate new ideas and themes into the existing AFOMP mission, standing, and contributions in a rapidly changing environment. We began and completed a first draft of a unified medical physics curriculum for the AFOMP countries in the previous term. Now I will attempt to complete it under the supervision of Prof Eva. As VP, I will also assist in all activities requested by the President to achieve all of the great AFOMP objectives that lie ahead of us. If the AFOMP excom permits, I would like to form an AFOMP women's group to address the challenges and promote female medical physicists in this region. As chair of the Award and Honor Committee, I'd like to encourage medical physicists in this region to work on research and other development projects.

MJ: SCMPCR is also striving hard to fulfill its objectives with the highest standards and are successful so far. Your take on goals to achieve for the coming year?

HAA: Cancer patients are on the rise in South Asian countries such as Bangladesh. Cancer patients in some South Asian countries are not receiving accurate and precise treatment due to inadequate manpower and medical facilities, resulting in their transfer to other developed countries.

Closing the gap in radiotherapy facility availability and developing human resource capacity are major challenges for cancer management in South Asia. The fight against cancer is a long-term effort, and success largely depends on strong government commitment. Regional cooperation can complement national efforts. Engagement and collaboration among governments, various international organizations, academic and research institutions, and non-governmental organizations are also crucial.

All the countries of South Asia are incorporating the latest equipment and techniques for cancer management. As a result, the need for highly skilled manpower in cancer treatment is undeniable. Hence, it is needless to say that SCMPCR can create skilled manpower - which has already been proven. Already, the steps taken by SCMPCR in developing medical physics in cancer treatment and research have been appreciated at the national and international levels. The main objective of SCMPCR is to share medical physics knowledge among all the countries of South Asia, including Bangladesh.

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SCMPCR is working as a training center not only for working medical physicists but also for students and trainees and cancer treatment related personnel.

MJ: Your advice/ suggestions to medical physics students and young professionals to fit best for the requirements and overcome the tests of times?

HAA: Medical Physicist is a very rewarding profession. We shall never forget that there is a human being, a sick person with all kinds of mixed feelings, placing his or her faith in our hands. This profession comes with a bundle of rules, routines, and regulations. We are the person behind the machine who ensures safe and effective treatment and diagnosis for cancer patients. A single mistake of us can lead to severe effects and death to the patient. I would like to request that students and young professionals to be a lifelong learner to adopt with the evolving technologies and take on the challenges of this noble profession. They should involve themselves in clinical work, research, and other professional leadership roles from early career under the supervision of qualified mentors.

MJ: Any special advice to women medical physicists?

HAA: There are two main obstacles we must overcome. Firstly, we must understand how to tackle all the hurdles in the family, society, prejudice, and gender discrimination. Secondly, once women start working in STEM fields, a lack of mentorship and insufficient family-friendly legislation all contribute to the pipeline's leakage. Everyone needs a mentor to guide women properly. The young female generations need to inform about the importance of STEM through seminars and workshops at different levels of education. We must establish a special partnership between radiation oncologists, clinical medical physicists, and academic medical physicists. The care and

treatment of cancer patients must be improved; thus, we must put in the time and effort necessary. Let's not wait to let the broken pipeline wipe out another generation. Let's fill the pipes jointly, men and women. The time has come to act. Together, we can make a difference.

MJ: Yes, indeed, ma'am. Thank you very much for sparing your time to share with us the enthralling story of medical physics in Bangladesh, which also can be called your story. I am delighted to know about your action plan for the coming years, which will empower not only physicists of Bangladesh and Asia-Oceania but also worldwide. The upcoming generations of women medical physicists also have a nurturing mentor and a role model to look up to in you. Yes, it's time to act and let us all stand together in supporting each other beyond any barriers. Together we can make a difference, and together, everyone achieves more.



Dr Mary Joan is Associate Professor and Radiological Safety Officer at Christian Medical College and Hospital Ludhiana, India. She is Chair, Professional Relations Committee AFOMP, Member- Science Committee IOMP and Executive Committee AMPI-NC and Co Editor-in-Chief of SCMPCR Newsletter. SCMPCR Newsletter, January 2023



IDMP IDoR programme

Dr. K. Mohamathu Rafic, Ph.D., MCMPI, Sr. Medical Physicist and RSO, Government Medical College and Hospital, Pudukkottai 622 004, India

Departments of Radiology, Medical Physics and Radiation Oncology, Government Medical College and Hospital (GMCH), Pudukkottai organized a daylong celebration of "International Day of Medical Physics (IDMP) and International Day of Radiology (IDoR) with a scientific event on 8th November 2022 at College Auditorium, GMCH Pudukkottai. As we all know, the last couple of years has brought remarkable challenges to healthcare systems worldwide. This year's themes of IDMP and IDoR are "Medical Physics for Sustainable Healthcare" and "Radiologists and Radiographers supporting patients". For that reason, we have planned to combine the celebration of IDMP-2022 and IDoR-2022 this year to bring awareness and to shed light on the importance of the teamwork of Physicians, Physicist and Radiographer/Technologist not only for diagnosis and treatment but also to ensure radiation safety for patients and professionals. We hope the past few years of difficulties don't stand in the way of celebrating this day to honour both IDMP-2022 and IDoR-2022.

The birthday of Madame Curie (on 7th Nov) and the date of production of the first x-rays by Sir Rontgen (on 8th Nov) are celebrated to honour their breakthrough discoveries that rapidly

revolutionized medicine, particularly the field of Medical Radiation Imaging and Therapy. To motivate young talents, we have organized a Quiz, Poster and Drawing competitions in offline and online modes on various topics related to potential uses and hazards of radiation in medicine, along with a hybrid CME event on 8th Nov 2022. 150+ Students from many districts



News and Events



actively participated in the event and presented their radiation awareness posters and drawings. Certificates and shields were awarded to the winners of all competitions. Moreover, registration for this event is set to be accessible for all.

IDMP and IDoR 2022 were formally inaugurated by the Guest of honour, Dean, Prof. Dr. M. Poovathi, MD, at 10.30 am on 8th November 2022. She delivered an inaugural speech on the importance of Medical Physics and Radiology. Vice Principal Dr. Kalaiyarasi, Medical Superintendent Dr. Thaiyalnayaki and Resident Medical Officer Dr. Indrani were present. Dr. S. Narmada, Associate Professor and Head of the Department of Radiology, delivered the welcome address. Dr K Mohamathu Rafic spoke about IDMP 2022 and its theme, "Medical Physics for Sustainable Healthcare", followed by a special cultural event. Radiation awareness poetry and meme, as well as on-stage reverse drawing events, were performed by our paramedical students. As part of the IDMP and IDoR 2022 celebration, the organisers also conducted a hybrid CME event. Dr K Mohamathu Rafic, Senior Medical Physicist and Radiation Safety Officer, delivered a lecture on "The History and evolution of Radiation Since 1895", Dr Sethuraman, Associate Professor, gave a talk on "Recent Advances in Medical Imaging and Dr K Punitha, Associate Professor delivered a speech on "Application of Medical Imaging in Radiation Oncology. As expected, the program provided an excellent opportunity to learn introductory radiation physics and advanced knowledge of cuttingedge medical imaging and therapy technologies, according to other medical specialists and participants. Dr. Krishnasamy Prasad, Head of the Department of Radiation, concluded the event by giving a vote of thanks to all the delegates. This programme was sponsored by BEBIG Medical GmbH, Germany and TeamBest Asia Pvt Ltd, Canada.

Congratulations ! Professor Dr. Athiyaman. M



Dr Athiyaman. M, a Medical Physicist & RSO at S. P. Medical College, Bikaner, Rajasthan, has been promoted to Associate Professor in Radiological Physics from 01-04-2022 onwards. Prof. Athiyaman started his career in 2009 at the Regional Cancer centre Bikaner and has effectively contributed to the centre's growth such as installation of an indigenous Telecobalt machine (2013), HDR Brachytherapy (2016), Indigenous Radiotherapy simulator (2019) & Rajasthan Government's first high-end Linear accelerator, True Beam (2022). He expresses gratitude to The Director, Dr H.S. Kumar, Regional Cancer Centre, Bikaner, and Dr Neeti Sharma, Head of Radiation Oncology, for their guidance and advice in his professional development. Prof. Athiyaman is also grateful to his PhD guide Dr Arun Chougule, Retired Senior Professor and Head of Radiological Physics at SMS Medical College, Jaipur. He completed his research work on Monitor Unit verification in complex fields and was awarded a PhD by the Rajasthan University of Health Sciences, Jaipur, in 2021. He is also an expert in Radiation safety and is involved in teaching Post Graduate (M.D. Radiotherapy) & Paramedical students.



Dr. K. H. Hoever and Prof. Golam Abu Zakaria in Bangladesh

It is with heavy hearts that we mourn the loss of Karl Heinz Hoever, a renowned medical physicist who dedicated his career to advancing the field of medical physics in Germany. Karl-Heinz Hoever was born in 1940 in Datteln, Germany. He studied physics at the University of Heidelberg, where he earned his doctorate in 1981 with a thesis on the biophysical basics of therapy with fast neutrons.

Dr. Hoever was an accomplished medical physicist known for his pioneering work in radiotherapy medical physics and his tireless efforts to improve patient care through innovative technologies and techniques. He spent most of his professional career as the head of the dosimetry group in radiation therapy at the German Cancer Research Center (DKFZ), where he worked from 1971 to 1998. Later on, he served as the radiation protection and operations manager of the research reactor from 1999 to 2005.

Dr. Hoever was the first chairman of the German Society of Medical Physics (DGMP) working group K16 'Medical Physics in Developing Countries' (1993-2001). In addition to his contributions to medical physics in Germany, Dr. Hoever also made significant contributions to the development of medical physics in Bangladesh and other developing countries. His expertise and guidance were instrumental in establishing medical education and training in Bangladesh. Along with Prof. Golam Abu Zakaria and other colleagues, Dr. Hoever was actively



The 1st meeting with Dr. Zafrullah Chowdhury (Founder of Gono University) in 1999 to start a Medical Physics Department

A Farewell to a Legend: Remembering Dr. Karl Heinz Hoever and His Dedication to the Development of Medical Physics in Bangladesh

involved in organizing several seminars cum workshops (1996, 1997, 1998, 1999, 2000, and later) in Bangladesh on the importance of medical physicists in radiotherapy.

These efforts led to the establishment of the Department of Medical Physics and Biomedical Engineering (MPBME) at Gono University, Dhaka, Bangladesh, in 2000.

His colleagues, students, and patients in both Germany and Bangladesh will forever remember him as a visionary and a dedicated mentor who was deeply committed to advancing the field of medical physics and improving patient outcomes. He was a true leader in his field and will be deeply missed.

On behalf of the entire SCMPCR team and Bangladesh Medical Physics Community, we extend our deepest condolences to his family, friends, and loved ones during this difficult time. His legacy will continue to live on through his impactful work and the many lives he touched. Karl Heinz Hoever's death is a huge loss for the medical physics community. His contributions and dedication to the field will always be remembered. May his soul rest in peace.



Karl Heinz Hoever in the several sessions of the seminar at BUET and Rajshahi

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News and Events



Hands-on Workshop on Advanced Treatment Planning with Eclipse TPS

Dr. K. Mohamathu Rafic, Ph.D., MCMPI, Sr. Medical Physicist and RSO, Government Medical College and Hospital, Pudukkottai 622 004, India

Christian Institute of Health Sciences and Research (CIHSR), Dimapur, Nagaland, India, organized a 2-day "Hands-on Workshop on Advanced Treatment Planning with Eclipse TPS" on 15th and 16th September 2022, with the objective of sharing the knowledge and practical skills required to implement advanced radiotherapy planning techniques safely and efficiently. In this workshop, we covered beam data collection and commissioning, portal dosimetry, hybridization of treatment plans (hybrid solitary dynamic portal radiotherapy, hybrid-IMRT and VMAT), planning techniques of craniospinal irradiation (CSI) and total body irradiation (TBI), total marrow and lymphoid irradiation (TMLI) and clinical use of generalized equivalent uniform dose (gEUD) optimization with Eclipse TPS. The topics we covered in this workshop were suitable for both young medical physicists and fully qualified physicists in India. The workshop was also packed with interactive features, viz., concept animations and step-by-step explanations of each concept with experienced physicists, as well as hands-on practice with Eclipse TPS and selfassessment exercises to reinforce effective learning of complex principles and planning techniques. Moreover, a special practical physics session on customized 3D printing of Bolus was also conducted in this workshop. This workshop was sponsored by Varian Medical System, USA and partly funded by PTW dosimetry, Germany.



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International Conference on Medical Physics 2023 (ICMP 2023)

Sunil Dutt Sharma, President, Association of Medical Physicists of India (AMPI)

On behalf of Congress Organizing Committee and the Organizing Board, we are delighted to announce that the Association of Medical Physicists of India (AMPI) is organizing the "International Conference on Medical Physics 2023 (ICMP 2023)" during 6th to 9th December 2023 in Mumbai, India. ICMP 2023 is the 25th Conference of International Organization for Medical Physics (IOMP). Further, ICMP 2023 will also be the 44th Annual Conference of AMPI (AMPICON 2023), the 23th Asia Oceania Congress on Medical Physics (AOCMP 2023) of Asia-Oceania Federation of Organizations for Medical Physics (AFOMP) and 2023 International South-East Asian Congress on Medical Physics (ISEACOMP 2023) of South-East Asian Federation of Organizations of Medical Physics (SEAFOMP). In fact, ICMP 2023 is jointly organized by AMPI, IOMP, AFOMP and SEAFOMP.

The scientific program of the conference will include all types of sessions and deliberations such as plenary sessions, special sessions, sessions on education & training and professional development, review talks on topics of recent interests and presentations on recent innovations in the discipline.

We welcome you all to the megapolitan city Mumbai which is the commercial capital of India. Mumbai is also known as the city that never sleeps and it is the perfect blend of culture, customs and lifestyles. Mumbai is dotted with plenty of architectural landmarks and it is the center of Indian film (Hindi Movie) and fashion industry. December is the perfect month for excursion in Mumbai and other parts of India.

All the information related to participation in the conference is being uploaded/updated at the conference website https://www.icmp2023.org

Please feel free to contact the conference organizing team through the email icmp2023@gmail.com



SCMPCR is delighted to share the recent news on the Medical Physics award, 'Dr.M.S. Agrawal Young Investigator Award 2021-2022,' received by Dr. Dilson Lobo, Assistant Professor Department of Radiation Oncology, Kasturba Medical College Mangalore, India, for outstanding research work in the field of Medical Physics. This award is instituted by the Association of Medical Physicists of India (AMPI) and is given annually.

Dr.M.S. Agrawal Young Investigator Award 2021-2022

News and Events



International Day of Medical Physics

Celebrated on 7th November 2022

At the Department of Medical Physics at MVR Cancer Center and Research Institute (MVRCCRI), Kerala, India



Mr. Arun Krishnan, Senior Medical Physicist On 7th November 2022, the Department of Medical Physics at MVR Cancer Center and Research Institute (MVRCCRI), Kerala, India celebrated the International Day of Medical Physics. The theme for the year is "Medical Physics for Sustainable Healthcare". The event was inaugurated by Dr. Anoop Nambiar, Chief Operating Officer of MVRCCRI by unveiling the caricature of Madame Curie, who pioneered the study of radioactivity. Dr.Dinesh Makuni, Head of Radiation Oncology moderated the session, recollected the everlasting memory of Madam Curie and her contribution to the evolution of Radiation Therapy. Mr. Arun Krishnan MP, Senior Medical Physicist delivered a talk about the importance of Medical Physics for Sustainable Healthcare. A creative poster was designed by Mr John Paul, Mr Anaz, and Ms Saveri, Medical Physicists at MVRCCRI and exhibited in hospital vitrine for giving awareness to the patients and public. It really conveyed the role and importance of the Medical Physicists in health sector. On this great day, MVRCCRI was also honoured by receiving best research paper award (AMPICON held at AIIMS, Delhi) to Dr. Niyas Puzhakkal, Chief Medical Physicist for the recent collaborative scientific work with National Institute of Technology, Calicut in Machine learning and Artificial Intelligence.



Congratulations ! Dr. Niyas Puzhakkal

Dr. Niyas Puzhakkal, Chief Medical Physicist & RSO at MVR Cancer Centre & Research Institute, Kerala, received the best research paper award in November 2022. This award was instituted by the Association of Medical Physicists of India (AMPI), and it was presented at the 43rd Annual Conference of the Association of Medical Physicists of India held at AIIMS, Delhi. Very innovative scientific research conducted in collaboration with the National Institute of Technology, Kozhikode, in machine learning and artificial intelligence has been selected for this award. The title of the research paper is "CT image synthesis from MR images using Wasserstein Generative Adversarial Network (WGAN) Architecture". This proposed model tries to generate goodfidelity synthetic CT images, which helps in radiation treatment planning. This study will support MR-only radiation therapy while minimizing uncertainty in image fusion, cost of treatments and extra radiation exposure in the process of CT simulation.



News and Events



5th Annual National Conference Celebration & International Day of Medical Physics in Pakistan

Collaboration with POMP (Pakistan Organisation of Medical Physicist) Organised by Department Of Radiotherapy - Dr. Ziauddin Hospital, Karachi. Shared by: Asad Yousuf and Hamza Abbasi

Background History:

Since 2013, the 7th of November has been celebrated as the international day of medical physics (IDMP) in recognition of Madame Marie Sklodowska- Curie's contributions to the field of radioactivity, who was born on this day, in 1867, in Poland. Pakistan Organization of Medical Physicists (POMP) was founded in 2012 to promote the medical physics community in Pakistan as well as internationally. POMP believes to interact and gather the community of Pakistan's medical physicists (MPs), professionals and students under one umbrella and aims to deliver professional guidelines. Important aspects of MPs as associated part of the healthcare workforce professionals are stated by the international labour organization (ILO), the international standard classification of occupation (ISCO).

This year's theme of the IDMP set by the International Organization for Medical Physics (IOMP) is "Medical Physics for Sustainable Healthcare". This annual conference is 5th in a row. The thematic areas of the conference were radiation oncology, nuclear medicine, radiology and medical physics for sustainable health care. This year, Dr. Ziauddin Hospital, Karachi, hosted this event at their institute for the second time.

Insights Highlights:

The 5th annual national conference to celebrate the international day of medical physics (IDMP) was organized by the department of Radiotherapy, Dr. Ziauddin Hospital, in collaboration with the Pakistan organization of medical physicists (POMP) on the 19th of

November 2022. As to highlight the significance of the medical physics profession in healthcare, the subject and theme of the conference were "Medical Physics for Sustainable Healthcare". Various hospital professionals, medical physics faculty members of universities, students of physics, Ph. Ds, radiation oncologists and technologists from all over Pakistan participated in this conference and also presented their research works. This event was recognized by IOMP this year through the combined efforts of all medical physicists of Pakistan.

On the day of the conference, invited professional guests delivered their remarkable talks to highlight the importance of medical physics and their lifetime professional experiences as motivation for professionals and students.

The POMP's scientific committee played a significant role in this conference. Abstracts received from all over Pakistan were reviewed and selected by members of the scientific committee for oral presentation and poster competition. This committee evaluated the oral and poster presentation competition as well.

Lifetime achievement awards were presented every year to honour the services of scientists who have promoted the field of medical physics in Pakistan. This year, Mr. Asdar ul Haq, Chief Scientist, Pakistan Atomic Energy Cancer Hospital, KIRAN was honoured with this award. Chief Guest was Mr. Muhammad Rahman, Member (Executive), one of the two full-time members of the Pakistan Nuclear Regulatory Authority (PNRA), and has the overall responsibility of the Executive Wing. The technical directorates, Directorate of Nuclear Safety (NSD), Directorate of

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Physical Protection and Nuclear Security (PPSD), Directorate of Radiation Safety (RSD) and Directorate of Transport and Waste Safety (WSD) are working under his supervision.

Many other activities related to medical physics were arranged in this event, such as; PNRA exhibiting their equipment, a career counselling booth in which experts counselled and advised students about the future aspects and opportunities, a poster presentation competition, a live question-answer session with Prof Faiz M. Khan, PhD, Professor Emeritus, the University of Minnesota Medical School Minneapolis via zoom link. It was a very interactive session, and all the participants got the chance to interact with Prof Faiz M. Khan.

Members of the organizing team were Dr. Jawaid A. Mallick (Head Cancer Hospital), Mr. Asghar Hussain (Principal Medical Physicist) and their team from Dr. Ziauddin Hospital, Dr. Almas Farhan from CPE department and Mr. Syed Mishkat Ali Jafri from PNRA

Sponsors:

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Congratulations ! Mr Asdar Ul Haque



SCMPCR congratulate Mr Asdar UI Haque for receiving the lifetime achievement award the chief scientist at KIRAN hospital. He played a vital role in the revival of LINAC-based radiotherapy in Pakistan. When he started to work in a medical centre, Co-60-based radiotherapy was common in Pakistan. He not only successfully commissioned and installed the new LINACS at the Atomic energy Cancer Hospital (KIRAN), Karachi but also efficiently functioning it for a long time. He also provided technical support to other medical centres where LINAC-based radiotherapy would start in the 2000s.



SCMPCR Congratulate Mr Bharath P for receiving the Best Oral Presentation Award at the IDMP 2022 symposium on 12th November 2022, organized by AMPI- Karnataka chapter & JSS academy of higher education and research institute, Mysuru. Mr Bharath is a medical physicist at the Department of Radiotherapy, Bangalore Baptist Hospital, Bangalore, India. The title of the abstract is A phantom study on the feasibility of manual field in clinical field implementation for total body irradiation and comparison of midplane dose with different bilateral TBI techniques.

Inauguration Ceremony of the Medical Physics and Nuclear Science Postgraduate Degree **Department of Nuclear Science, U**

Mahesh Jeyakody, Department of Nuclear S

The Department of Nuclear Science (DNS), University of Colombo, Sri Lanka, has held a virtual inauguration ceremony to welcome the newly enrolled students for the MSc Degree Programs in Medical Physics & Nuclear Science 2022 intake on the 21st of August, 2022. This has been the very first inauguration ceremony held by DNS with the participation of international experts in the field. The ceremony took place on the virtual platform enabling the invited international quests to attend online. Limited on-site participation was allowed in the lecture theatre of the DNS under the COVID health and safety protocols of the University. All the new students, current MSc students and the staff of the DNS attended the event. Being the only Department in the Sri Lankan university system, DNS bears the sole responsibility of disseminating knowledge in the field of Nuclear Science by offering degree programs and increasing public awareness. Among the several programs provided by DNS, MSc degree in Medical Physics & Nuclear Science is open for both local and international students.

The event was graced virtually by the special guests Prof. Dr. Arun Chouqule, Dean & Chief Academic officer Swasthya Kalyan Group of institutes, Ex. Senior Professor, Department of Radiological Physics S.M.S. Medical College & Hospitals, Jaipur, President, AFOMP, Chair ETC and Accreditation Board IOMP., Member Board of Directors IMPCB, Prof. Dr. Hasin Anupama Azhari, Secretary-General, Asia- Oceania Federation of Organization for Medical Physics (AFOMP), Director, Centre for Biomedical Science and Engineering, United International University (UIU) and Prof. Dr. Golam Abu Zakaria, Anhalt University of Applied sciences, Koethen, Germany, Founder chairman of South Asia Center for Medical Physics and Cancer Research (SCMPCR) in Dhaka, Bangladesh.

Marking the initiation of the session, Dr. Manuja Lamabadusuriya, Head of the DNS, warmly welcomed the newly



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News and Events

mes, offered by the lombo, Sri Lanka

Guest Speakers





Prof Arun Chougule Dean and Chief Academic Officer, Swasthya Kalyan Group, India. President of Asia- Oceania Federation of Organization for Medical Physics (AFOMP), Chair of ETC of International Organisation of Medical Physics (IOMP), Chairman of the IOMP Accreditation Board. IMPCB Board of Directors.

Prof. Dr. Golam Abu Zakaria Professor of Clinical Engineering Anhalt University of Applied Sciences Germany & Founding Chairman, South Asia Centre for Medical Physics and Cancer Research (SCMPCR) Dhaka, Bangladesh.

Prof. Hasin Anupama Azhari CEO, South Asia Centre for Medical Physics and Cancer Research (SCMPCR), Secretary-General, Asia Oceania Federation of Organization fo Medical Physics (AFOMP), Director, Centre for Biomedical Science and Engineering, United International University (UIU), Bangladesh.

Invited Speakers

enrolled students and congratulated them for being selected for the degree programs. Afterwards, a brief introduction to the Medical Physics & Nuclear Science degree programs was given by the coordinators of the programs, Dr. Jeyasingam Jeyasugiththan, Senior Lecturer at DNS and Dr. Manuja Lamabadusuriya, respectively. The invited talks from international experts in the field followed this. Prof. Chougule delivered an exciting speech on Pathways to Becoming an International Recognised Medical Physics Professional. He presented the scope and a whole gamut of potentialities available for those who are seeking professions in the field of Medical Physics. As the next invited speaker, Prof. Azhari gave an inspiring talk on Women in Medical Physics and Opportunities highlighting that Medical physics as a field with increased female enrollment. In his quest speech, Prof. Zakaria gave valuable insights on Global Opportunities for Medical Physics Graduates: Training and Carrier. In his speech, he explained how the field of Medical Physics opens doors to many career paths. Mr. Duminda Satharasinghe, Lecturer at DNS, gave the vote of thanks and the ceremony was concluded with the best wishes from the guests for the students to excel well in the postgraduate degree programs.

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9.40 am	Pr Me
9.50 am	Pr Nu
10.00 am	Inv Be rec Pro Ch
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11.20 am Vot



SOUTH ASIA CENTRE FOR MEDICAL PHYSICS AND CANCER RESEARCH

(A Project of Alo Bhubon Trust)

SUBMISSION **DEADLINE FOR NEXT ISSUE:** May 30, 2023

The main objectives of SCMPCR

SCMPCR

To organise awareness, prevention, and screening program for cancer disease.

To provide adequate training to all personnel associated with cancer treatment.

To establish the clinical residency training program for medical physicists.

To develop the infrastructure of e-learning and library.

To establishment welfare home for poor cancer patients.

To build a self-help groups for cancer patients

To establish a team who will assist in the management and quality control (QC) procedure for the diagnostic radiology equipment in the districts levels.

SCMPCR was established on 3rd July 2018 and is comprised of a group of philanthropic personnel with representatives from different regions of South Asia to work on different projects. SCMPCR is an autonomous body under All Bhubon Trust (Alo-BT) and is accountable to its board of trustees/governors. It is a non-profit public partnership which will seek support from other sources. It shall work conjointly with various national and internationals organisations. The major activities of SCMPCR are: to produce skilled manpower, enhance health education and establish a welfare home for cancer patients.

MISSION

TO Achieve UNDP SDG-goal 3 & 4

OUR VISION

PROVIDE OUALITY SERVICES IN CANCER TREATMENT THROUGH

TRAINING, EDUCATION

E- LEARNING IN

RADIOTHERAPY AND

IMAGING DISCIPLINES.

INCLUDING

GOALS OF SCMPCR

Major activities of SCMPCR are to produce skilled manpower, enhance health education and establish a welfare home for cancer patients.

UNDP SDG-goal 3 (Good Health & Well-being)

Awareness program for the mass people for different communicable and non-communicable diseases, especially for cancer patients.

UNDP SDG-goal 4 (Quality Education)

Arranging and conducting training programs to develop skilled manpower. It realizes the need to educate specially; women regarding the screening and prevention of cancer treatment under UNDP SDG-goal 4.

PROJECT of ALO BHUBON TRUST (Alo-BT)

FIND



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OUR MOTTO QUALITY EDUCATION AND HEALTH SCIENCE FOR PATIENT BENEFIT